

WHAT ESA CAN DO FOR YOU?

ESA R&D Optional Programmes for PNT Technology and Product Developments



Initiative	ESA	Industry	Member States
Programmes	<ul style="list-style-type: none"> • TRP • GSTP EL1 <i>Develop</i> • NAVISP EL1 <i>Innovate</i> 	<ul style="list-style-type: none"> • GSTP EL2 <i>Make</i> • NAVISP EL2 <i>Competitiveness</i> 	<ul style="list-style-type: none"> • NAVISP EL3 <i>Support</i>
Funding	100% funded by ESA	Co-funded by ESA & Industry	100% funded by ESA
Result	Feasibility Prototypes Core technologies	Technologies and Products ready for Market	Test and validation campaigns



TRP and GSTP : Develop



- Yearly workplans for fully funded development activities (ITTs on EMITS)
- Key areas of innovation for PNT technologies planned in 2019:

PVT assurance

- Very high accuracy (<0.3m) in challenging environments
- Situational awareness
- Security & resilience of PVT

Enablers for safety-critical usage

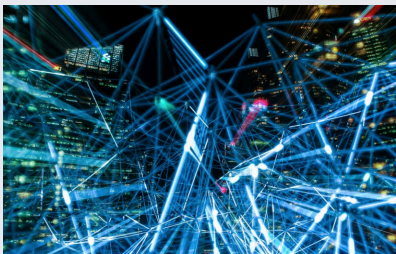
- Aviation
- Maritime
- Railway



Space receivers

- On-board Precise Orbit Determination (e.g. PPP)
- Low cost/small satellites
- Reconfigurable/shared on-board processing (e.g. SDR)

Low energy positioning



Complementary positioning technologies

- Sensor fusion
- Indoor positioning (non-GNSS)
- Complements to GNSS backbone (e.g. LEO PNT)

Disruptive technological enablers for PNT space infrastructure

- Distributed integrity
- Artificial intelligence
- 2-way ranging
- Alternative frequency bands



GSTP Element 2 Make (formerly GSTP 6.2)

→ Support Industrial competitiveness

- Develop innovative technologies and products
- Creating sustainable businesses
- Industry defines the business case and the technical specifications
- Open Call for Proposal with direct negotiation (AO7935)
- Requires support from National Delegation
- Maximum level of co-funding by ESA:



	General Rule	SME and University
Prototype up to TRL 5	75%	75%*
Product up to TRL 6/7	50%	75%

* up to 100% for Universities under certain conditions

What?

- Design, development, testing, productisation
- Space, Ground and User developments (SW/FW/HW)
- From components to systems



91

activities
currently
running

**6
to
24**

months per
activity
typically

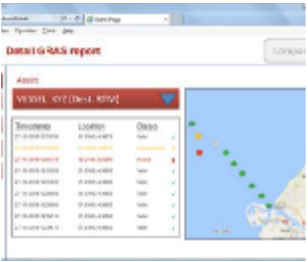
**several
100 k€
to M€**

typical
value per
activity

GSTP Element 2 Make Examples in PNT



Professional Receiver



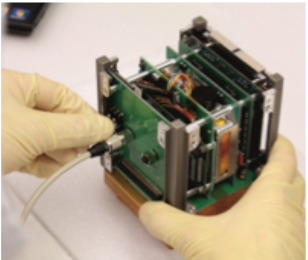
Anti-spoofing Software



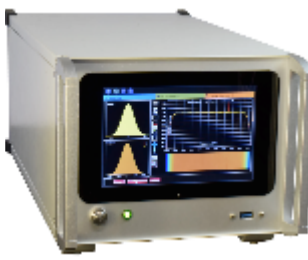
Real-Time Simulators



Chipset development



Cubesat development



Data Acquisition and Replay



GSTP : Make Timeline

5



Technology or product ready for market launch

IPR belong to company



4



Development contract



3



Full Proposal

Company defines:

- Business case
- Technical objectives
- Work to be performed



2



Outline Proposal + Support from National Delegation



1



Idea for Space or Ground product

NAVISP Element 1 Innovation in PNT

- Contribution to PNT technology innovation all along the value chain
- Feasibility studies for the emergence of new PNT concepts
- Proof of concepts of promising PNT techniques
- Competitive ITTs, Fully funded, on the basis of yearly Work Plans approved by Member States
- External expert working group from the wide PNT sector as advisor to NAVISP Element 1 programme



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NAVISP Element 2 Competitiveness in PNT

- Develop competitive technologies and products all along the value chain
- Industry defines the technical specifications and identifies product viability
- Open Call for Proposal with direct negotiation (AO8927)
- Requires support from National Delegation



NAVISP Element 2 Competitiveness in PNT



- Ownership of the deliverables **left to the companies** upon completion of the contract
- Streamlined procurement process: contract award in less than **90 days**
- **ESA in facilitating mode** towards new comers – we are responsive
- Maximum level of co-funding by ESA:

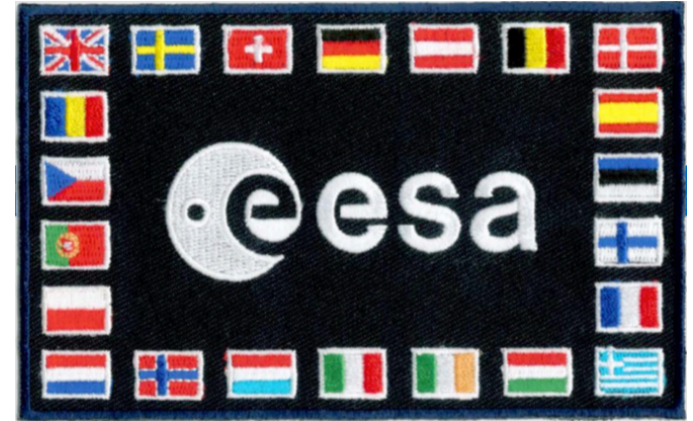
General Rule	SME	University and Research Center*
50%	80%	100%

* up to 100% if involved as sub-co with no further commercial interest



NAVISP Element 3 Support

- Support to Member States national PNT programmes and initiatives
- Open Call for Proposal with direct negotiation (AO9427)
- Requires support from National Delegation
- Fully Funded



Way forward for CMIN19



- NAVISP implemented at a **very fast pace**
- **60% of the available funds** of the five years envelope already incubated at 30% of programme lifetime
- **Second phase** in preparation for CMIN19 with the objective of doubling the annual funds from 20 M€ to **40 M€ per year**

Reminder:
NAVISP Industry Days Workshop
17+18 January 2019 at ESTEC
Registration online at
<https://navisp.esa.int>



For more information

GSTP

http://www.esa.int/Our_Activities/Space_Engineering_Technology/Shaping_the_Future/About_the_General_Support_Technology_Programme_GSTP

TRP

https://www.esa.int/Our_Activities/Space_Engineering_Technology/Shaping_the_Future/About_the_Technology_Research_Programme_TRP



emits

EMITS

<http://emits.sso.esa.int>



NAVISP

<https://navisp.esa.int>



Outline Proposal Toolkit

<http://gstp.esa.int>